

CLAIMS:

1. A substrate processing method of roughening a surface of a substrate through a dry etching method, said method comprising:

5 placing said substrate on an RF electrode inside a chamber;

placing a plate to cover said substrate, said plate being provided with a number of opening portions, an open area ratio of the opening portions on a peripheral portion side being 10 smaller than an open area ratio of the opening portions in a central portion as viewed in a plane;

introducing a gas inside a chamber; and

applying an RF power supply to said RF electrode.

2. The substrate processing method according to Claim 15 1, wherein:

said plate is placed to be spaced apart from said substrate by 5 to 30 mm.

3. The substrate processing method according to Claim 1, wherein:

20 said substrate is one of a plate and a film member made of one material selected from silicon, glass, metal, plastic, and resin.

4. The substrate processing method according to Claim 1, wherein:

25 the dry etching method is a reactive ion etching method.

5. A substrate processing apparatus that roughens a surface of a substrate through a dry etching method, said apparatus comprising:

a chamber;

5 an RF electrode provided inside said chamber to place said substrate thereon;

an RF power supply that supplies said RF electrode with power; and

10 a plate placed over said substrate and provided with a number of opening portions,

wherein an open area ratio of the opening portions on a peripheral portion side is smaller than an open area ratio of the opening portions in a central portion when said plate is viewed in a plane.

15 6. The substrate processing apparatus according to Claim 5, wherein:

said plate is made of one of aluminum and glass.

7. A plate used in a substrate processing apparatus that roughens a surface of a substrate through a dry etching method, 20 said plate being placed to cover the surface of said substrate to be processed and provided with a number of opening portions,

wherein an open area ratio of the opening portions on a peripheral portion side is smaller than an open area ratio of the opening portions in a central portion as viewed in a plane.

25 8. A substrate processing method of roughening a

surface of a substrate through a dry etching method, said method comprising:

placing said substrate on an RF electrode inside a chamber;

5 placing a plate to cover said substrate while securing a distance from the surface of said substrate, said plate being provided with a number of opening portions, each opening portion being of a size such that allows a virtual column having a diameter equal to or less than half (1/2) the distance to pass
10 through the opening portion while inhibiting a virtual column having a diameter greater than half the distance from passing through the opening portion;

introducing a gas inside said chamber; and

applying an RF power supply to said RF electrode.

15 9. The substrate processing method according to Claim 8, wherein:

said plate is placed to be spaced apart from the surface of said substrate by 5 to 30 mm.

10. The substrate processing method according to Claim 20 8, wherein:

the dry etching method is a reactive ion etching method.

11. A substrate processing apparatus that roughens a surface of a substrate through a dry etching method, said apparatus comprising:

25 a chamber;

an RF electrode provided inside said chamber to place said substrate thereon;

an RF power supply that supplies said RF electrode with power; and

5 a plate placed over said substrate and provided with a number of opening portions,

wherein each opening portion in said plate is of a size such that allows a virtual column having a diameter equal to or less than half a distance between said plate and the surface 10 of said substrate to pass through the opening portion while inhibiting a virtual column having a diameter greater than half (1/2) the distance from passing through the opening portion.

12. The substrate processing apparatus according to Claim 11, wherein:

15 the distance between said plate and the surface of said substrate is 5 to 30 mm.

13. The substrate processing apparatus according to Claim 11, wherein:

said plate is made of one of aluminum and glass.

20 14. A plate used in a substrate processing apparatus that roughens a surface of a substrate through a dry etching method, said plate being placed to cover the surface of said substrate to be processed and provided with a number of opening portions,

25 wherein each opening portion is of a size such that allows

a virtual column having a diameter equal to or less than half a distance between said plate and the surface of said substrate to pass through the opening portion while inhibiting a virtual column having a diameter greater than half (1/2) the distance 5 from passing through the opening portion.

15. A substrate processing method of roughening a surface of a substrate through a dry etching method, said method comprising:

placing said substrate on an RF electrode inside a 10 chamber;

placing a plate to cover said substrate, said plate being provided with a number of opening portions, chamfered portions being provided to the top and/or bottom corners of the opening portions;

15 introducing a gas inside said chamber; and

applying an RF power supply to said RF electrode.

16. A substrate processing apparatus that roughens a surface of a substrate through a dry etching method, said apparatus comprising:

20 a chamber;

an RF electrode provided inside said chamber to place said substrate thereon;

an RF power supply that supplies said RF electrode with power; and

25 a plate placed over said substrate and provided with a

number of opening portions,

wherein chamfered portions are provided to the top and /or bottom corners of the opening portions in said plate.

17. The substrate processing apparatus according to
5 Claim 16, wherein:

said plate is made of metal.

18. The substrate processing apparatus according to
Claim 17, wherein:

said plate is made of aluminum.

10 19. The substrate processing apparatus according to
Claim 16, wherein:

said substrate processing apparatus comprises a reactive ion etching apparatus.

20. A plate used in a substrate processing apparatus
15 that roughens a surface of a substrate through a dry etching method, said plate being placed to cover the surface of said substrate to be processed and provided with a number of opening portions,

wherein chamfered portions are provided to the top and/or
20 bottom corners of the opening portion.